2nd Gen Oxitec (OX5034) EUP Application and September 2019 Nature Research Paper

Issue: Evans *et al.*, 2019 paper in Nature Research[1] contradicts Oxitec's hypothesis that mosquito lab strain genes will disappear quickly from the environment. The data and methods appear to be scientifically sound and increases OPP concern regarding the introduction of mosquito lab strain genes into natural mosquito populations for the pending Oxitec EUP application.

Action in Review

- OCSPP is currently reviewing an application Oxitec submitted for an Experimental Use Permit (EUP) to test the efficacy their 2nd Generation OX5034 mosquitoes. If approved by EPA, Oxitec would conduct experimental trials in Florida and Texas next year.

Action Timeline

- *March 11, 2019*: Oxitec submitted application for an EUP.
- *July 1, 2019*: EPA sent 10-day deficiency letter noting critical deficiencies in the application.
- *July 16, 2019*: Oxitec submitted response to 10-day deficiency letter.
- *August 26, 2019:* Oxitec submitted additional critical data supplementing existing submissions; EPA had not determined whether the response to the 10-day letter was sufficient to pass the 90-day screen.
- *September 10, 2019:* Evans *et al.*, *Nature Research* paper publishes.
- *September 11, 2019:* Notice of Receipt published beginning a 30-day public comment period. Oxitec originally requested that EPA not publish NOR until after EPA confirmed the application passed the 90-day screen. Around August 26, Oxitec requested EPA no longer wait to confirm the application passed the 90-day screen prior to publishing the NOR. The NOR was working through typesetting for FR publication at this time and OCSPP decided to confirm the application passed the 90-day screen prior to publishing the NOR.
- *October 11, 2019*: Comment period closes.
- *November 1, 2019*: Current PRIA date – will need to be renegotiated to allow time to address comments, complete risk assessments, have peer review of assessments, OGC and management review of decision.
- *June 2020*: Estimate of new PRIA date needed with internal government HHS/CDC peer review.
- *January 2021*: Estimate of new PRIA date needed with external SAP.

Synopsis of Public Comment through Sept. 27, 2019

- EPA has received 58 public comments so far. Four (4) commenters have requested an extension of the comment period.
- 21 of which reference the recent Evans *et al.*, 2019 publication or information from news articles about the paper including three comments requesting an extension of the comment period to assess the results in the Evans *et al.*, 2019 publication in relation to the current application.
    - Several of these comments mention the need to assess and minimize risk of gene movement and have mitigation strategies in place in the event introgression occur if this application is approved.
    - Several commenters referencing the article, who indicate they are otherwise supportive of GM technology, are opposed to OX5034 mosquito releases unless risks associated with introgression (e.g., potential for increased disease transmission) can be addressed. They do not want to let the "genie out of the bottle."
- Other issues mentioned are antibiotic resistance, risk to non-target organisms, informed consent.
- EPA anticipates numerous additional comments prior to October 11, some notable NGOs such as the Center for Food Safety from whom we typically receive comment have not provided comment at this time.

Background

- Oxitec withdrew their prior applications for an EUP and registration for OX513A, the 1st generation product to EPA. Their application for OX513A was approved in Brazil and mosquitoes were subsequently released.

[1] [HYPERLINK "https://www.nature.com/articles/s41598-019-49660-6"]

- OCSPP has completed the initial screening level review of Oxitec's OX5034 and has moved the application into full review.
- 2nd Gen Oxitec mosquitoes (OX5034) allow for male survival and subsequent reproduction in the environment and thus the likely introduction of lab strain genes into the wild mosquito population (i.e., introgression).
- OCSPP identified the possible movement of genes from the released OX5034 mosquitoes into the wild mosquito populations as a potential issue in pre-submission meetings and again after submission of the application.
- Evans *et al.*, 2019 (published Sept 10) contradicts Oxitec's hypothesis that lab genes will disappear quickly from the environment. The article examines Oxitec's 1st generation GE mosquito where this is less of a risk. Yet, it demonstrates the movement of genes is occuring.
- This issue is credible and deserves scientific scrutiny since the current EUP application before OCSPP (2nd generation OX5034) is expected to have a greater risk of gene movement into the wild mosquito population. While the data in the Evans *et. al.* paper is sound, we recognize that many of the points in the discussion section are not supported by the actual data in the paper.
- OPP does not know at this point whether the Oxitec's 2nd generation OX5034 lab strain has genes that would increase the likelihood of disease transmission. However, increased disease transmission could be possible and movement of the lab strain genes into the environment in Florida or Texas could be permanent and not limited to the experimental use permit.
- We note that Oxitec has filed a complaint to Nature Research concerning what they consider misleading and speculative statements, [HYPERLINK "https://www.oxitec.com/news/oxitec-response-scientific-reports-article"]

Potential next steps

Ex. 5 Deliberative Process (DP)